

## APPENDIX C

NCEP USE OF THE EXTENDED

GRIB PDS SECTION FOR

DESCRIBING ENSEMBLE OUTPUT

## NCEP GRIB PDS Extension for Ensemble Models

Elements of individual ensemble members are identified in GRIB by a special extension to the PDS section beyond octet 40. Typically, the PDS of a regular GRIB file will only contain 28 bytes (also called octets). However, for most ensemble applications, more than 28 octets are needed to properly identify the particular ensemble member, probability type, cluster, etc.

This appendix details NCEP's use of the extended GRIB PDS section (Octets 41 to 86) to describe ensemble model data. Currently there are no WMO standards for including this extra information on ensemble data in GRIB1.

EXTENSION OF PDS SECTION FOR ENSEMBLE PRODUCTS	
Octet	Description
41	<b>Identifies Application</b>  1 = Ensemble
42	<b>Type</b>  1 = Unperturbed control forecast 2 = Individual negatively perturbed forecast 3 = Individual positively perturbed forecast 4 = Cluster 5 = Whole ensemble
43	<b>Identification Number</b>  If Byte 42 = 1, byte 43 will = 1 or 2: 1 = High resolution control forecast 2 = Low resolution control forecast  If Byte 42 = 2 or 3, byte 43 will = 1,2,3,4 or 5: This number indicates the identification number for this member of a pair. That is, there is a first negative perturbation and a first positive perturbation (n1 and p1).

44	<p align="center"><b>Product Identifier</b></p> <p>1 = Full field (individual forecast) / Unweighted mean (cluster/ens)  2 = Weighted mean  11 = Standard deviation with respect to ensemble mean  12 = Standard deviation with respect to ensemble mean, normalized</p>
45	<p align="center"><b>Spatial Smoothing of Product</b>  (number of highest total wave number included)</p> <p align="center">255 = Original resolution retained</p>
<p align="center"><b>Probability Section</b>  (Octet 46 and above are used only if needed)</p>	
46	<p align="center"><b>Probability Product Definition</b></p> <p>If octet 9=191 or 192, defines variable in terms of octet 9 table (see below for more details)</p>
47	<p align="center"><b>Probability Type</b></p> <p>1 = Probability of event below lower limit  2 = Probability of event above upper limit  3 = Probability of event between lower and upper limits</p>
48-51	<p align="center"><b>Probability Lower Limit</b>  (unit as in octet 9; floating point number)</p>
52-55	<p align="center"><b>Probability Upper Limit</b>  (unit as in octet 9; floating point number)</p>
56-60	<p align="center"><b>Reserved</b></p>
<p align="center"><b>Clustering Section</b>  (Octet 61 and above are used only if octet 42=4 or 5)</p>	
61	<p align="center"><b>Ensemble Size</b>  (number of members, including controls)</p>

62	<b>Cluster Size</b> (number of members)
63	<b>Number of Clusters</b>
64	<b>Clustering Method</b>  1 = AC 2 = RMS
65-67	<b>Northern Latitude of Clustering Domain</b> (in thousandths of degree)
68-70	<b>Southern Latitude of Clustering Domain</b> (in thousandths of degree)
71-73	<b>Eastern Longitude of Clustering Domain</b> (in thousandths of degree)
74-76	<b>Western Longitude of Clustering Domain</b> (in thousandths of degree)
77-86	<b>Cluster Membership</b> (If octet 42=4)  Indicates in binary (on/off) format, which members of the ensemble belong to the current cluster. Membership table defined by product generators.